

IN THE DRAWINGS

The attached sheets of drawings include changes to Figures 1-3 and 7. The first sheet, which includes Figures 1-3, replaces the original sheet including Figures 1-3. The second sheet, which includes Figures 6 and 7, replaces the original sheet including Figures 6 and 7.

Attachment: 2 Replacement Sheets

REMARKS/ARGUMENTS

Favorable consideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-20 are pending in the application, with Claims 2-6 are amended and new Claims 7-20 are added by the present amendment. Amended Claims 2-6 and new Claims 7-20 are supported by the original claims and specification.¹ No new matter is added.

In the outstanding Office Action, the drawings and abstract were objected; Claim 6 was rejected under 35 U.S.C. §112, second paragraph; Claims 1, 3-4 and 6 were rejected under 35 U.S.C. §102(b) as anticipated by Hagle et al. (U.S. Patent No. 5,207,558, hereinafter “Hagle”); Claims 1-4 and 6 were rejected under 35 U.S.C. §102(b) as anticipated by Snyder (U.S. Patent No. 4,619,580); Claim 5 was rejected under 35 U.S.C. §103(a) as unpatentable over Snyder in view of Ortolano (U.S. Patent No. 5,133,643).

With regard to the objection to the drawings, new Figures 1-3 are submitted herewith including a consistent depiction of the apparatus recited in Claim 1. A replacement sheet including the label “Conventional Art” is also submitted herewith. Finally, page 3, lines 10-12 of the outstanding Office Action asserted that a figure showing the turbine rotor located aft of the injectors, as recited in Claim 1, must also be added. However, it is respectfully noted that Figure 7 shows a turbine rotor 40 with injectors 50 distributed upstream of the rotor. Accordingly, it is respectfully submitted that Figure 7 shows the claimed subject matter. Consequently, the objection to the drawings is believed to be overcome.

With regard to the objection to the abstract, the abstract is amended herewith to conform with U.S. practice. Accordingly, the objection to the abstract is believed to be overcome.

¹See, e.g., the specification at page 5, line 21 to page 6, line 5 and Figure 2.

With regard to the rejection of Claim 6 under 35 U.S.C. §112, second paragraph, Claim 6 is amended herewith to delete the word “determined.” Accordingly, Claim 6 is believed to be in compliance with all requirements under 35 U.S.C. §112, second paragraph.

With regard to the rejections of Claim 1 as anticipated by Hagle or Snyder, these rejections are respectfully traversed.

Claim 1 recites in part:

each injector comprises a bimetallic structure with a first metal material forming a major portion of the structure of the injector and having a first coefficient of thermal expansion, and a second metal material forming a complementary portion of the structure in the vicinity of the suction side wall meeting the trailing edge of the injector, and having a second coefficient of thermal expansion that is smaller than the first.

In contrast, Hagle discloses a device for injecting cooling air into a turbomachine turbine rotor comprising a plurality of injectors which modify the section of the aerodynamic throat in the device, where each injector has the structures of Figures 2, 3 or 5 of Hagle with all include a three piece airfoil.

The embodiment shown in Figures 2 and 3 of Hagle includes a first fixed part (26) and second (24) and third (30) movable portions. The third portion (30) is connected to the fixed part (26) and to the second portion (24) and has a coefficient of thermal expansion larger than that of the fixed part.²

The embodiment shown in Figure 5 of Hagle includes a three piece airfoil with a fixed foil (40) and two movable foils (38, 42). The moveable foil (42) has a coefficient of thermal expansion larger than that of the fixed foil (40).³

In either case, third portion (30) and moveable foil (42) are both made of a single material. Consequently, Hagle does not teach “a second metal material forming a complementary portion of the structure in the vicinity of the suction side wall meeting the

²See Hagle, column 2, line 67 to column 3, line 16

³See Hagle, column 3, line 49 to column 4, line 4.

trailing edge of the injector,” as recited in Claim 1. Accordingly, Claim 1 (and Claims 2-6 dependent therefrom) is not anticipated by Hagle and is patentable thereover.

Snyder does not relate to a device for modifying the section of the aerodynamic throat of the cooling air passing through injectors but to a vane suitable for use as a variable stator vane. This vane is made of the parts of different materials facing each other throughout the vane such that an overall change in the curvature of the vane is possible.⁴ On the contrary, in the injector recited in Claim 1, the second metal material forms a complementary portion of the structure in the vicinity of the suction side wall meeting the trailing edge of the injector. Thus, Snyder does not teach the claimed injector, and Claim 1 (and Claims 2-6 dependent therefrom) is not anticipated by Snyder and is patentable thereover.

With regard to the rejection of Claim 5 as unpatentable over Snyder in view of Ortolano, it is noted that Claim 5 is dependent from Claim 1, and thus is believed to be patentable for at least the reasons discussed above. Further, it is respectfully submitted that Ortolano does not cure any of the above-noted deficiencies of Snyder. Accordingly, it is respectfully submitted that Claim 5 is patentable over Snyder in view of Ortolano.

New Claim 7 is supported by the original claims and Figure 2. New Claim 7 recites in part:

each injector comprises,
a leading edge portion including a first metal material
having a first coefficient of thermal expansion, and
a trailing edge portion including the first material and a
second metal material forming a complementary portion on a
suction side of the injector, said second material having a
second coefficient of thermal expansion that is smaller than the
first,
wherein said leading edge portion is free of said second
metal material.

Hagle describes a vane with a trailing foil (24) or (38). It is respectfully submitted that there is no teaching or suggestion in Hagle that either trailing foil (24) or (38) include

⁴See Snyder, column 7, lines 3-31 and Figures 3 and 5.

two different materials. Accordingly, Hagle does not teach or suggest “a trailing edge portion including the first material *and* a second metal material forming a complementary portion on a suction side of the injector” as recited in new Claim 7. Further, Hagle describes that the leading edge portions (30) and (42) comprise a different material than that of portions (26) and (40), respectively. The portions (26) and (40) are made of a material with a coefficient of thermal expansion that is smaller than the coefficient of thermal expansion of portions (30) and (42).⁵ Thus, Hagle also does not teach or suggest “wherein said leading edge portion is free of said second metal material” as recited in new Claim 7.

Snyder describes a vane that includes *two different materials* along the entire length of the vane.⁶ Accordingly, Snyder does not teach or suggest “wherein said leading edge portion is free of said second metal material” as recited in new Claim 7.

Consequently, since the cited references do not teach or suggest each and every element of Claim 7, Claim 7 (and Claims 8-15 dependent therefrom) is patentable over the cited references. Further, the cited art fails to teach or suggest the features of new Claims 13-15.

New Claims 16-20 are supported at least by the original claims and the specification at page 5, line 21 to page 6, line 5. New Claim 16 recites in part:

forming an injector from the bimetallic structure, said injector having,
a leading edge portion including the first metal material, and
a trailing edge portion including the first material and the second metal material, the second material forming a complementary portion on a suction side of the injector,
wherein said leading edge portion is free of said second metal material.

⁵See Hagle, column 3, lines 11-13 and column 3, line 64 to column 4, line 4.

⁶See Snyder, column 7, lines 3-31 and Figures 3 and 5.

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As discussed with respect to Claim 7, the cited references do not teach or suggest an injector wherein "said leading edge portion is free of said second metal material."

Accordingly, neither of the cited references teaches or suggests forming this injector, as recited in new Claim 16. Thus, Claim 16 (and Claims 17-20 dependent therefrom) is patentable over the cited references.

Accordingly, in view of the present amendment and in light of the previous discussion, Applicants respectfully submit that the present application is in condition for allowance and respectfully request an early and favorable action to that effect.

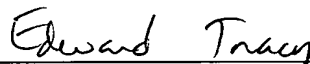
Respectfully submitted,

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